REMARKS

Entry of the foregoing and reconsideration of the subject application are respectfully requested in light of the amendments above and the comments which follow.

As correctly noted in the Office Action Summary, claims 58-64 were pending. By the present response, claims 58 and 61 have been amended, claims 63-64 canceled and claims 72-74 added. Thus, upon entry of the present response, claims 58-62 and 72-74 remain pending and await further consideration on the merits.

Support for the foregoing amendments can be found, for example, in at least the following locations in the original disclosure: the original claims and the specification, page 25, lines 10-13

CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 58, 59, 62, 63 and 64 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,875,329 to Washizu et al. (hereafter "*Washizu et al.*") on the grounds set forth in paragraphs 3-5 of the Official Action. For at least the following reasons, the rejection should be withdrawn.

The rejection of claims 63 and 64 is moot because claims 63 and 64 have been canceled.

With regard to claims 58, 59 and 62, please consider the following remarks.

It has been surprisingly found that metallic and semiconducting groups of nanostructure-containing materials can be separated from a mixture by attraction to different electrodes under an asymmetric AC electric field. As disclosed in the specification, an asymmetric AC field is established in the liquid by applying an AC

voltage between two electrodes, such as two electrodes with different geometries. The frequency of the AC field is adjusted. Because of the difference in electronic properties, the polarization of the metallic and semiconducting carbon nanotubes will have a different frequency dependence carbon nanotubes of one type of electronic property will move towards one of the electrodes and carbon nanotubes of another different type of electronic property will move towards the second different electrode. In one example, metallic carbon nanotubes migrate toward one electrode and semiconducting carbon nanotubes move toward a second electrode. In another example, the different geometries of the electrodes include a planar geometry and the a sharp protrusion. In another situation, it is possible to adjust the frequency and the liquid used such that under certain conditions, the metallic carbon nanotubes move towards one electrode while the semiconducting carbon nanotubes move toward the opposite electrode. The separated groups can then be recovered at the respective electrodes. See, page 25, lines 10-22.

The above techniques and methods are generally embodied in applicants' claims. For example, independent claim 58 is directed to a method of separating groups of nanostructure-containing materials. The claimed method comprises, *inter alia*, suspending the materials to be separated in a liquid medium, introducing a plurality of electrodes into the suspension, the plurality of electrodes including at least a first electrode and a second electrode, the first electrode having a different geometry from the second electrode, establishing an asymmetrical alternating-current (AC) electrical field within the mixture between the first electrode and the second electrode, adjusting the frequency of the AC field to a suitable value to cause at least a first group of materials with one type of electronic properties to migrate to

the first electrode and causing a second group of materials with a different type of electronic properties to migrate to the second electrode, and recovering at least the first group from the liquid medium at the first electrode.

Washizu et al. is directed to methods for separating substances using a dielectrophoretic technique. As disclosed in *Washizu et al.*, the shapes of the electrodes and the hollow space may be "a circle, oval or a polygon" (see col. 8, lines 55-56). Figs. 3-18 of *Washizu et al.*, which includes Fig. 14 referenced by the examiner, are plan views showing these types of shapes.

Comparing the disclosure in *Washizu et al.* to independent claim 58, it is respectfully noted that *Washizu et al.* does not disclose the separation of nanotubes or nanowires by dielectrophoretic techniques. For at least this reason, an anticipatory rejection is improper because *Washizu et al.* does not disclose the invention as claimed. See MPEP § 2131. Accordingly, withdrawal of the rejection is respectfully requested.

Applicants respectfully note that the remaining claims rejected above each depend from independent claim 58 and are therefore distinguishable over the cited reference for at least the same reasons as noted above with respect to the independent claims. Accordingly, withdrawal of the rejection of the dependent claims is also respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. §103

Claims 60 and 61 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Washizu et al.* combined with U.S. Patent Application Publication No. 2004/0038251 A1 to Smalley et al. (hereafter "*Smalley et al.*") on the grounds set

forth in paragraphs 8-9 of the Official Action. For at least the reasons noted below, these rejections should be withdrawn.

The cited references, either alone in the proposed combination do not contribute to overcome the above noted deficiencies in the primary references. Accordingly, a prima facie case of obviousness has not been established and withdrawal of the rejection is respectfully requested.

Washizu et al. does not disclose the separation of nanotubes or nanowires by dielectrophoretic techniques. *Smalley et al.* is cited for the teaching that it is desirable to separate metallic type nanotubes from the semiconducting nanotubes (see paragraph [0085]). However that portion of Smalley et al. merely indicates that it is desirable to separate these materials and does not disclose here how the separation occurs. *Smalley et al.* teaches that separation of the type occurs sequentially by migration of protonated nanotubes toward one electrode. First, metallic nanotubes are protonated and separated by migration toward one electrode followed by further protonation of semiconducting nanotubes and their separation toward the same electrode (see paragraphs [0065] to [0068] and [0070] to [0073]). However, there is no suggestion in either of these documents that dielectrophoretic techniques to cause at least a first group of materials with one type of electronic properties to migrate to the first electrode and causing a second group of materials with a different type of electronic properties to migrate to the second electrode as claimed.

Further, it is not clear that one of ordinary skill in the art familiar with the step-wise or sequential method of Smalley et al. applied to nanotubes and the single operation dielectrophoretic techniques of *Washizu et al.* which are not applied to

nanotubes would have been motivated to combine the select points of each disclosure. Nor would there be an expectation of success for such a combination. For at least these further reasons, a *prima facie* case of obviousness has not been established and the rejections should be withdrawn.

NEW CLAIMS

New claims 72-74 have been added. With respect to at least claim 74, it is noted that *Washizu et al.* does not use different shaped electrodes to establish an asymmetrical electrical field. In addition, *Smalley et al.* does not cause the metallic and semiconductor nanotubes to migrate to respective differently shaped electrodes. Therefore, the references alone or in combination do not disclose, teach or suggest at least this feature. For at least this reason, at least new claim 74 distinguishes over the cited documents.

INFORMATION DISCLOSURE STATEMENTS

Two Information Disclosure Statements have been submitted in this application. As of the Official Action dated April 21, 2005, **one** Information Disclosure Statement **has not been acknowledged** by the Examiner by return of an initialed Form PTO-1449.

Herein is summarized for the convenience of the Examiner the Information Disclosure Statements submitted in this application:

Date Submitted	Number of Pages in PTO Form 1449	Status
May 17, 2004	1	**Not initialed; not returned**
February 4, 2005	1	Initialed and Returned

It is respectfully requested that the status of the Information Disclosure Statement filed May 17, 2004, be acknowledged by the Examiner in the next communication. A copy of the May 17, 2004 Information Disclosure Statement is attached along with the dated postcard receipt.

CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

Date: July 21, 2005

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